

given by Scott and Osborn for *Metamynodon**, but in the present specimen the teeth are less compressed antero-posteriorly and are more square in plan.

As nothing is as yet known of the form of the canines and incisors, the attribution of this species to the genus *Metamynodon* is tentative. Another Oriental species—*M. birmanensis*,—smaller than the present one, has been ascribed to this genus by Pilgrim †. It is, however, represented by very fragmentary remains, and seems to be as near to *Cadurcotherium* as to *Metamynodon*.

LXXV.—*Some Remarks about Eastern Hedgehogs.*

By EINAR LÖNNBERG, F.M.Z.S. &c.

WHEN recently classifying some hedgehogs from Eastern Asia, the present author had the occasion to study more closely the literature of this group. Among other papers he also studied an early, but very valuable paper by Sundevall ("Öfversigt af slägtet *Erinaceus*," K. Vet.-Akad. Handl. Stockholm, 1841).

In this the author quoted speaks about thirteen different species of hedgehogs, some of which he describes for the first time. These are arranged in two groups, and about them Sundevall expresses his opinion in the following terms: "The known species show such a great agreement in structure that they may be regarded to constitute a single indivisible genus; but, as, nevertheless, some of them, viz. those which in the following constitute the second section, evidently form a small, extremely natural, subordinate group, many naturalists, who love to make new genera, may consider that they ought to separate them as an independent genus, and I wish to their service propose to use for this group the name *Ericius*. It will, however, in such a case be necessary to separate generically in a similar way *E. aethiopicus* and *E. heterodactylus*, which differ as much from each other as from *E. auritus* and *europaeus*."

From this it is apparent that Sundevall recognised that the hedgehogs, in spite of their general agreement, could be divided into certain groups. Only for one of these groups he proposed, although with a certain humour, *Ericius* as a name of subgeneric value, but at the same time he admitted

* Scott and Osborn, Harvard Bulletin, vol. xiii. p. 169.

† Pilgrim and Cotter, Rec. Geol. Surv. India, vol. xlvii. part 1 (1916).

that this group may be regarded by other authors as a real genus. It is evident from his words that Sundevall considered *auritus* as the type of the *Eriacus* group, and if this one is taken as a genus or a subgenus this name must be used for the same. The other species, which Sundevall enumerates as belonging to the same, are *platyotis*, Sundevall, *ægyptius*, Geoffr., *hypomelus*, Brandt, *collaris*, Gray, *spatangus*, Bennett, and *dauricus*, Sundevall.

When accepting *Hemiechinus*, Fitzinger, 1866, as a genus among the hedgehogs, Satunin and others have also considered *auritus* as the type for the same, although, as Thomas in his recent review (Ann. & Mag. N. H. ser. 9, vol. i. 1918) points out, this name "is not included in Fitzinger's original paper." Thomas gains, however, the same result by selecting *platyotis*, Sundevall, as type for *Hemiechinus*, because it is found in Fitzinger's list, and by synonymizing in agreement with Anderson *platyotis* and *auritus*. As Sundevall already in 1841 proposed the name *Eriacus* for that group of hedgehogs to which *auritus* and *platyotis* belong, *Hemiechinus* is reduced to a synonym of the same. It is of interest to find that Sundevall refers to his *Eriacus* group, in addition to those already mentioned, mostly the same species as Thomas (*l. c.*) counts to *Hemiechinus*—viz. *collaris*, *grayi* (and the identical *spatangus*), and *dauricus*.

It is of interest as well to find that Sundevall also had recognised that his *heterodactylus* = *albiventris*, Wagner, now referred by Thomas to the genus *Atelerix*, and his *æthiopicus*, now by Thomas referred to the genus *Paraechinus*, were so different *inter se* and from the others that they might be generically separated.

With regard to the supposed identity of *auritus*, Gm., and *platyotis*, Sundev., it must be remembered that this identification was done at a time when the geographic races were less studied and less valued than now. The present author has unfortunately no material of the true *auritus* for comparison, and can thus only judge with the aid of the literature, but according to that it appears little probable that the identification mentioned can be upheld according to modern views. "*Erinaceus auritus*" was, of course, from the beginning, a comprehension of all hedgehogs with large ears from Southern Russia, about Volga and all through Central Asia, and southwards to Transcaucasia, &c. By and by, from this heterogeneous mass, was split off *albulus*, Stol., with its several subspecies in different parts of Central Asia. Later on (1901) Satunin proved that the hedgehog in the country around Mount Ararat was a different species, which

he named *caligoni*. In the same paper the author quoted says about *auritus* that "it does not go farther south than the Ust-Urt in the Transcaspiian province." He adds further "the distribution of *E. auritus* begins in the steppes of the Northern Caucasus, in the plains of the Manytsh; it then extends to the north between the Don and the Volga, up to the hillocks of Ergheni, and thence goes eastward through the Volga-Ural and the Kirghiz steppes approximately between 45° and 55° N. lat." The eastern boundary line he supposes to be at the Balkash-depression. In Persia another hedgehog (*persicus*, Satunin) is at home, and so on. It is then very difficult to believe that the real *auritus* should have another centre in Egypt. It appears thus most probable to the present writer that *platyotis*, Sundev., can defend its rank as a racial unit different from the Russian *auritus*.

The latter appears to be a larger animal, as Satunin records the length as amounting up to 210 mm.; while Sundevall gives the same dimension of *platyotis* as 165 mm. The skull of *auritus* has at least partly larger dimensions. The zygomatic width of the same being about 30-31, while it is 26-27 mm. in *platyotis*. Least postorbital breadth of the former 12-12.5 (*Satunin*), in the latter (Sundevall's type-specimens) 11-11.2 mm. Breadth across *m*¹ in the former 19-19.2 (*Satunin*), in the latter 16.5-17 (fide *Anderson* even 17.5). No doubt further direct comparisons of typical material will prove the distinctness of Sundevall's *platyotis*.

In connection with this, I take the opportunity of communicating some remarks on imperfectly or not at all known hedgehogs from Eastern Asia.

Erinaceus dealbatus, Swinhoe.

Three specimens from Mi-Yün-Hsien and two from Shun-I-Hsien, Niu-Lang-Shan, both localities in Chihli, Oct. 1920, presented by Professor J. G. Anderson to the R. Nat. Hist. Museum, Stockholm.

The original description of this hedgehog is very short and insufficient, but, to judge from the locality, I think the identification must be correct. The median parting of the spines on the crown with a naked area between them is well visible both in the younger and older specimens. The latter are much lighter in their general colouring, because they have a great number of entirely white spines. The coloured ones are usually white at the base, then follows a very broad brownish ring, which, however, is not very well defined, but

gradually fading as well upwards as downwards. Above the same is a narrower ring of white or brownish white, and, finally, a short brownish tip. In some cases the broad brownish ring is so evanescent that the result is a white spine with a short brownish tip. In the smaller (younger) specimens the pure white spines are few, and among the others the brown rings are often darker and may reach down to the root of the spine. By this the general colour becomes darker. The length of the spines is about 18–21 mm. The hairs of the big specimens are white, a little greyish or brownish in the face. Ears short, rather broadly rounded, concealed in the fur, almost naked on the posterior side, sparingly beset with short brownish hairs on the inside. Length from lower outer angle to tip about 20 mm. The smaller specimens are brownish grey along the flanks below the spines, and also somewhat brownish in the face around the eyes and between them. The hairs on the feet are also somewhat brownish. The tail is very short, about 12 mm. The claws are pale horn-brown with whitish tips on the fore feet, a little darker on the hind feet. The length of the latter without claws is in the big specimens 35 mm. Length of head and body about 205 mm. (All measurements from alcoholic specimens.)

The claws of the fingers are much smaller than those of *Erinaceus europæus*, especially is this the case with those of the first, fourth, and fifth fingers. On the second and third hind toe the claws are not much smaller than in the Swedish hedgehog, but that of the fourth is plainly smaller, and this is still more the case with those of the fifth and first hind toes, the last of these latter sometimes almost looking rudimentary. The anterior plantar pads large and confluent, the two posterior also large and confluent only with a median groove, indicating their duplicity. The soles are somewhat rugose and there are also granular eminences, but few and only little defined. None of that kind is seen behind the posterior plantar pads.

The following cranial measurements from an adult male may prove of value for further comparison with other forms:—

	mm.
Greatest length of skull	51
Condylø-basal length	51
Basal length	47
Zygomatic breadth	31
Mastoid breadth	25
Palate-length (from notch)	29
Length of nasals mesially along suture	15

	mm.
Greatest combined breadth of nasals	3
Interorbital width at <i>for. lacr.</i>	16.2
Least postorbital width	14
Width across premaxillaries	12.3
Width across outside of m^1	20.5
Entire maxillary tooth-row	27.3

These measurements prove that *E. dealbatus* is considerably smaller with regard to cranial dimensions than the Common Hedgehog and the species which will be described below from Korea. From the former it differs also with regard to the transverse position of m^3 . There is a rather broad shelf behind the transverse posterior ridge of the palate and also a median spine. *C* is double-rooted.

The sagittal crest is not very strong and does not encroach much on the frontals.

Erinaceus koreanus, sp. n.

O. e specimen from Chosen, Korea. (Type in R. Nat. Hist. Mus. Stockholm.)

The median parting on the crown is well pronounced, and leaves a rather broad naked area between the groups of spines. The line forming the anterior limit of the spines on the crown runs at an equal distance between eye and ear. The spines covering the head and nape are somewhat more slender than those of the body, and appear also to be more regularly directed backwards in one and the same direction than the former. Behind them there is a zone on the upper neck, in which the spines are arranged more irregularly crosswise and somewhat shorter, many being only about 15 mm. or even less, while the spines of the head and the back, as a rule, are about 20 mm. The spiny head-covering looks paler than that of the body, because many of the spines are wholly white and the others have in the upper third an indistinctly defined pale brownish ring, above this one a white ring, and finally a brownish tip. The spines of the body display the same pattern. There are many white spines as well, but those annelated with brown have the rings more deeply coloured and some of them are also brownish at the root as well. All taken together this hedgehog looks, however, very pale compared with the European one. The naked area above the snout is much longer than the breadth of the rhinarium. The hairs above the same are rusty whitish, becoming more white in the middle of the face, but above and below the orbits brown hairs are more numerous than the white mixed in. The fore head in front of the real spines is beset with long and bristly—or, perhaps better, spinous—hairs, which are brownish

white. The sides of the neck to above the shoulders are covered with very long bristly hairs, white with a somewhat rusty tint. On the whiskers the colour deepens and shades into cinnamon and then rapidly into "tawny" (*Ridgway*, 1912) or "fawn" (*Rép. de Couleur*, 308·2), which colour occupies the lower surface from the chin to the breast, then the colour becomes lighter and shades on the middle of the belly to "cinnamon-buff" (*Ridgway*) and almost to whitish towards the flanks and anal region. The fore feet are a little more cinnamon than "sayal-brown," darker towards the hands. The hind legs and feet are very similar to *Ridgway's* "snuff-brown."

The ears are beset with brownish hairs on the margin, white inside. Total length of the preserved dry specimen 24 cm.; tail about 28 mm.; hind foot (s. u.) 39 mm.; ear about 26 mm. The claws have about the same development as in the Common Hedgehog, and are not reduced on the first and fifth toes in such a way as in *Erinaceus dealbatus*. The Korea Hedgehog has larger feet than the last-mentioned, and the posterior plantar pads seem to be less confluent.

	mm.
Greatest length of skull.....	56
Condylo-basal length.....	56
Basal length.....	52·6
Zygomatic breadth.....	36·4
Mastoid breadth.....	27
Palate-length (from notch).....	31
Length of nasals mesially along suture.....	12·7
Greatest combined breadth of nasals.....	3·3
Interorbital width at <i>for. lacr.</i>	17·5
Least postorbital width.....	13
Width across premaxillaries.....	13
Width across outside of m^1	22·5
Entire maxillary tooth-row.....	27·4

The specimen is an old male with rather strongly worn teeth. The sagittal crest is strongly developed and extends forward over the posterior half of the frontals. The ante-orbital crest is well developed, especially above *for. lacrymale*. The nasals are very short mesially, but extend laterally as slender processes forward along the premaxillary for some distance, so that by this the naso-premaxillary suture becomes as long as the naso-maxillary and naso-frontal sutures together. The nasals do not reach further backwards than to the level of *foramina lacrymalia*. The premaxillary terminates rather broadly behind. The nasal processes of the frontals very slender. I^1 very long and slender. C double-rooted. M^3 has a more transverse position than in the Common Hedgehog, but not so much as in *E. dealbatus*.

Pterygoid fossa narrow, only 3.5 mm. where it is broadest, hardly 3 mm. at posterior end. There is a rather broad shelf behind the transverse posterior ridge of the palate, but there is also a well-developed median spine (unlike in *E. orientalis*, Allen).

Geographically spoken, *Erinaceus orientalis*, Allen, 1903, and *E. ussuriensis*, Satunin, 1906, are perhaps the next neighbours to this hedgehog from Korea. The latter differs, however, very much with regard to the striking coloration of its lower side with its cinnamon and tawny shades, while *E. orientalis* is said to have the "ventral surface very pale yellowish," and *E. ussuriensis* is in the middle of breast and belly "greyish white," otherwise greyish brown with a mixture of white hairs. The shoulders of the latter appear to have the last-mentioned mixture of brown and white hairs, and in *E. orientalis* they are "pale greyish sandy brown," but in the Korea Hedgehog white. The skull of the latter is smaller than that of both the other species, and especially is the shortness of the nasals striking, and this depends as well on the shortness in front as on less extension backwards.

Erinaceus chinensis, Satunin, 1906, from Chiungan, is, according to its author, covered on the lower side with "dichter weisser Wolle," and it is thus rather different from the Korea animal. The skull of the former is larger than that of the latter and, although the single type-specimen is said to be young, it had already longer nasals than the old specimen from Korea. Satunin expresses a suspicion that possibly his *chinensis* may prove identical with *dealbatus*. It is very difficult to form any definite opinion in this matter, but it does not appear very probable. Perhaps it is more related to *orientalis*.

The difference between the Korea Hedgehog and *E. dealbatus* is very great, not only with regard to the colour, but also with regard to the smallness of the claws of the latter. The cranial characteristics are also very different, e. g., the difference in length of nasals.

Ericius przewalskii, Satunin.

1 ♀, 17. 8. 1920, Bank Tjaggan, Mongolia; 1 ♀, 17. 8. 1920, near Burtun Nor, Mongolia (*Professor Andersson coll.*).

Several names have been given to members of this genus (= *Hemiechinus*, Fitz.) found in Eastern Asia, e. g., *dawuricus*, Sundevall, 1841, *albulus alaschanicus*, Satunin, *przewalskii*, Satunin, 1907, and *miodon*, Thomas, 1908. Of these *albulus alaschanicus* is easy to exclude at once from the comparison with the present specimens, in consequence of its small size. The remaining three are much similar as well *inter se* as also

with the present specimens, and it is not easy to find out the distinguishing characteristics from the descriptions only.

Thomas's *miodon* from Shensi is perhaps to be excluded, because it has a smaller, especially shorter, skull. When describing it, the author quoted compared it chiefly with *E. dealbatus*, and as this belongs to another group (nowadays even another genus) the characteristics of *miodon* used to distinguish it from *dealbatus*, as, for instance, the small size of p^3 , are shared also by the Mongolian Hedgehog, because it belongs to the same natural group.

The name *przewalskii* was given by Satunin to a hedgehog collected in "Nord-China?" The description of the same agrees very nearly with the present specimens as well with regard to the exterior features generally as also with regard to cranial dimensions (*cf.* below).

The general appearance has a certain resemblance with that of a European hedgehog, although a little paler, but on a closer examination it is widely different by reason of its very large ears, comparatively long tail, and absence of any bare median space between the spines of the crown. The spines are directed towards different sides, which partly may be due to the fact that they are curved, the curvature being most pronounced in their basal parts. The spines on the crown, which are decidedly more slender than those on the back, are also less curved. They are brown at their base in varying degree, then follows a white ring and again a dark brown or blackish ring, which occupies the greater part of the distal half. Outside this is a subapical white ring, and finally a short brownish tip. The length of the spines is about 21–23 mm. The hairs are not quite so coarse as in a Common Hedgehog, and not at all so bristly as in *E. koreanus*. The snout and the surroundings of the eyes are brownish grey, the forehead paler, almost brownish white. The long hairs on the sides of the neck above the shoulders and along the flanks are white, the shorter hairs somewhat greyish. The whole underside is dirty white, more woolly in the young one. The fore feet have a colour somewhat resembling "otter-brown" (Rép. de Coul. 354:4), the hind feet a little darker and more brownish. The ears are fringed with hairs similar in colour to those on the fore feet, but almost naked on the outside, inside with white hairs.

The vibrissæ on the sides of the snout are rather well developed and black. The total length of the larger dry specimen is about 21 cm. The hind foot of the same (*s. u.*) is 41 mm. and the dry ear about 24 mm. It is, however, of course, very much shrunk, which is proved by the fact that the ear of the somewhat smaller alcoholic specimen is from

the notch to the tip 3.2 mm. The tail measures 25 mm. from vent.

The claws are long and strong. Those of the fore feet of the old specimen are truncate at the tip, evidently worn by digging. They are horny white, and their degree of development is about the same as in the Common Hedgehog, thus no incipient reduction anywhere as in *E. dealbatus*.

The plantar pads are distinct, not confluent. Between and behind them are numerous granular eminences.

The only real discrepancy between this and Satunin's description, as far as it goes, is that he says that the length of the ear is only 19 mm., but this may be explained by the fact that his type-specimen was mounted, and this organ may therefore have shrunk very much.

The following cranial measurements of the present old hedgehog from Mongolia agree on the whole with those of Satunin's specimen, so that they certainly do not prohibit an identification. On the other hand, there is not much difference between Satunin's measurements and those by Radde, which are referred to *dauricus*, Sundevall. It seems therefore hardly possible to tell, for the present, whether Satunin's *przewalskii* really differs from the same, and if they are synonymous Sundevall has half a century priority. In any case *przewalskii* cannot be more than a subspecies of *dauricus* :—

Cranial Dimensions of the Hedgehog from Bank Tjagan.

	mm.
Greatest length	56
Condyllo-basal length	55.5
Basal length	51.5
Zygomatic breadth	36.5
Mastoid breadth	29.3
From palatal notch to tip of premax.	31.5
Length of nasals mesially	13.3
Length of nasals diagonally	14.5
Interorbital width at <i>for. lacr.</i>	18.5
Least postorbital width	13.8
Width across premaxillaries	15.5
Width outside m^2	24
Entire maxillary tooth-series	28.7
Greatest transverse diameter of p^3	2
Transverse diameter of m^1	6.3

The sagittal crest is low and not much developed, and it does not reach in front of *sutura coronalis*. The premaxillary is rather broad behind, but just at the nasal suture it is produced in a narrow tip, which on one side meets the nasal process from the frontal, on the other leaves a short contact between the nasal and the maxillary. The posterior end of the nasals reaches to the level through the *for. lacrymale*.

Since the above was written, I have had the pleasure of receiving from Professor J. G. Andersson another (alcoholic) specimen of *Eriacus przewalskii* from Tabool, Mongolia. This one is a male, somewhat paler than the female, especially on the head. Its length from snout to vent is about 235 mm.; hind foot (s. u.) 43 mm.; tail 31 mm.; ear 33 mm. The cranial measurements are somewhat similar to those recorded above; the nasals are a little longer and on both sides in contact with the maxillaries. Although the specimen is old, the sagittal crest is only little developed.

PROCEEDINGS OF LEARNED SOCIETIES.

GEOLOGICAL SOCIETY.

January 4th, 1922.—Dr. G. T. Prior, F.R.S.,
Vice-President, in the Chair.

The following communication was read:—

'Shales-with-Beef, a Sequence in the Lower Lias of the Dorset Coast.'

Part I.—Stratigraphical. By William Dickson Lang,
Sc.D., F.G.S.

The Shales-with-Beef lie between Table Ledge below and the *Birchi* Bed above, and consist of an upper 30 feet of brownish paper-shales with selenite, 'beef,' and limestone-nodules and lenticles; and a lower 40 feet of bluish conchoidal marls with indurated marl-beds, beef, and limestone-nodules and lenticles.

The following are the main palæontological divisions:—

Micro-derocer- Arietites, Sulciferites, Cynabites.	{	76 a. <i>Birchi</i> -tabular. <i>Microderoceras birchi</i> . <i>Arietites turneri</i> , <i>Xiphoceras</i> spp., <i>Cynabites</i> .
		75 a. <i>Birchi</i> -nodular. <i>M. birchi</i> , <i>Ar. plotti</i> , and allied forms.
		74 h-i. <i>Microderoceras</i> spp. and <i>Arietites</i> spp.
Arietites, Arnioceras, Sulciferites [Spath].	{	74 e-g. <i>Arnioceras hartmanni</i> and allied forms.
		74 c-d. <i>Ar. brooki</i> .
		70 f-74 b. <i>Arnioceras</i> spp., <i>Arietites</i> new spp., <i>Sulciferites</i> [Spath] spp.
Pararnioceras [Spath], Arnioceras, Agassiceras.	{	70 a-e. <i>Pararnioceras</i> [Spath] <i>alcinoë</i> and allied forms. <i>Arnioceras</i> spp.
		62 a-69 c. <i>Arnioceras</i> spp., <i>Agassiceras</i> spp., but no <i>Ag. striaries</i> .
		55-61 b. Do., but with <i>Agassiceras striaries</i> .
		53-54. <i>Arnioceras</i> , characteristic new species, and allied forms.